**WHAT IS CLAIMED IS:**

1. A system for monitoring an aerosol including a plurality of particles, each of the particles having a size, comprising:

an impactor assembly to receive the aerosol at a first flow rate and remove an exhaust portion of the particles that are less than a minimum particle size or greater than a maximum particle size, a remaining portion of the particles being emitted at a second flow rate lower than the first flow rate; and

at least a first sensor to measure a characteristic of the remaining portion of the particles.

2. The system of Claim 1 further comprising a third impactor to receive a first portion of the exhaust portion of the particles, the third impactor to remove another portion of the first portion of the exhaust portion of the particles to leave a fractionate portion of the particles; and

a second sensor to measure a characteristic of the fractionate portion of the particles.

3. The system of Claim 1 wherein the characteristic of the remaining portion of the particles is selected from the group consisting of mass and chemical composition.

4. The system of Claim 2 wherein the characteristic of the fractionate portion of the particles is selected from the group consisting of mass and chemical composition.

5. The system of Claim 1 wherein the first impactor removes the exhaust portion of the particles greater than the maximum particle size; and

the second impactor including a first virtual impactor to remove the exhaust portion of the particles less than the minimum particle size, a first flow of the first virtual impactor to emit the remaining portion of the particles.

6. The system of Claim 1 wherein the first impactor removes the exhaust portion of the particles less than the minimum particle size; and

the second impactor including a second virtual impactor to remove the exhaust portion of the particles greater than the maximum particle size, a first flow of the second virtual impactor to emit the remaining portion of the particles.

7. The system of Claim 1 wherein the range of the particle sizes is about 2.5 um to 10 um.

8. The system of Claim 1 wherein the sensor includes a tapered element oscillating microbalance (TEOM).

9. The system of Claim 1 wherein the sensor is selected from the group consisting of a TEOM, light scattering photometers, a beta attenuation monitors, optical counters, ion chromatographs, inductively-coupled plasma mass spectrometers, graphite furnaces, thermal desorption units, and mass spectrometers.

10. The system of Claim 1 further comprising a pump to pull the aerosol into the impactor assembly.

11. The system of Claim 10 wherein a ratio of the first flow rate to the second flow rate includes a range from 2 to 50.

12. A method of monitoring an aerosol, comprising:

receiving the aerosol at a first flow rate;

removing a first range of the particles being less than a minimum particle size;

removing a second range of the particles being greater than a maximum particle size;

after removing the second range and the first range of the particles, a remaining portion of the particles including particles having a size in a range between the minimum particle size and the maximum particle size;

emitting the remaining portion of the particles at a second flow rate less than the first flow rate so that the remaining portion of the particles includes a concentrated quantity of particles having a size in the range between the minimum particle size and the maximum particle size; and

measuring a characteristic of the remaining portion of the particles.

13. The method of Claim 12 further comprising selecting the first flow rate.

14. The method of Claim 12 wherein the minimum particle size is 2.5 um and the maximum particle size is 10 um.

15. A method of monitoring an aerosol, comprising:

receiving the aerosol at a first flow rate;

removing a first range of the particles being less than a minimum particle size;

removing a second range of the particles being greater than a maximum particle size;

after removing the second range and the first range of the particles, a remaining portion of the particles including particles having a size in a range between the minimum particle size and the maximum particle size;

emitting the remaining portion of the particles at a second flow rate less than the first flow rate so that the remaining portion of the particles includes a concentrated quantity of particles having a size in the range between the minimum particle size and the maximum particle size;

measuring a characteristic of the remaining portion of the particles.

receiving one of the first range of particles and the second range of particles;

removing a third range of particles from the one of the first range of particles and the second range of particles, so that a fractionated portion of the particles remains; and

measuring a characteristic of the fractionated portion of the particles.

16. A system for measuring a characteristic of an aerosol including a plurality of particles, each of the particles having a size, a mass, and a chemical composition, comprising:

a first impactor assembly to receive the aerosol at a first flow rate and to remove a first range of the particles as a first function of particle size,

a second impactor assembly coupled to an outlet of the first impactor to remove a second range of the particles as a second function of particle size, a remaining portion of the particles being emitted from the second impactor at a second flow rate lower than the first flow rate; and

at least a first sensor to measure a characteristic of the remaining portion of the particles.

17. The system of Claim 16 wherein the characteristic of the remaining portion of the particles is selected from the group consisting of mass and chemical composition.

18. The system of Claim 16 wherein the range of the particle sizes is about 2.5 um to 10 um.

19. The system of Claim 16 wherein the sensor includes a tapered element oscillating microbalance (TEOM).

20. The system of Claim 16 wherein the sensor is selected from the group consisting of a TEOM, light scattering photometers, a beta attenuation monitors, optical counters,

ion chromatographs, inductively-coupled plasma mass spectrometers, graphite furnaces, thermal desorption units, and mass spectrometers.

21. The system of Claim 16 further comprising a pump to pull the aerosol into the impactor assembly.

22. The system of Claim 21 wherein the first flow rate includes the range of 5 lpm to 100 lpm.